Bellcomm

955 L'Enfant Plaza North, S.W.
Washington, D. C. 20024

date: January 19, 1972

to: Distribution

B72 01007

from: S. C. Wynn

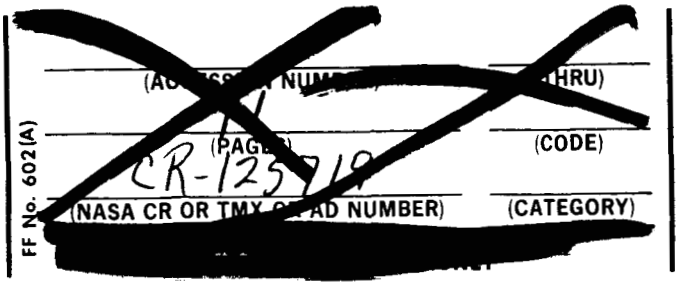
subject: Two Computer-Generated Views of the Descartes Landing Area from the LM During Descent -- Case 310

MEMORANDUM FOR FILE

In Reference 1, a computer generated view of the Descartes landing area representing some of the region visible to the Commander and LM pilot just after high gate was presented. This view was expanded to include all of the region visible to the Commander (Figure 1) and LM pilot (Figure 2). The outlines of the LM windows, modified to include the portions of the LM body obstructing vision, are superimposed on the figures. Cylindrical projections were used since planar projections produce distorted images for wide angles of view. Ideally, the figures should be mounted on the inside of a cylinder and viewed from within. The observation point for Figures 1 and 2 was 5660 feet above the landing site (9°00'01'S, 15°30'59"E) and 12,960 feet directly east.

Another view was generated which represents the region visible to the Commander (Figure 3) and the LM pilot (Figure 4) near the manual takeover point. The observation point for this view was 630 feet above the landing site and 2010 feet directly east.

The computer-generated representation of the lunar surface is produced by processing digitized elevation data obtained from the U. S. Army TOPOCOM using both 1:25,000 and 1:100,000 scale maps of the Descartes region. The 1:25,000 scale map is roughly centered on the landing area and inset into the 1:100,000 scale map (the interface between the two maps occasionally appears as a discontinuity or fault line in the scene). The data are scanned to determine which points are visible to the



observer, plotted in perspective and connected by lines of constant latitude and longitude. In the foreground the lunar surface is depicted by a grid 25 by 25 meters. The background points are connected by a grid 50 by 50 meters to reduce the darkening as the lines become close together. Note that the relative brightness of surface features is due to variations in line density and does not correspond to the actual albedo of the scene. Shadowed areas are indicated for a sun elevation of 7° by dots located at grid intersections.

The curved horizon appearing in the figures results from the attitude of the observer relative to the scene. The observer is assumed to be oriented with the axis of his head and neck perpendicular to a line from the landing site to his eye. As he scans the scene across the window his head rotates about this axis. Since this axis is about 22 degrees off vertical the horizon drops off as he looks towards the North or South from West. The limit of the data, about 12 km West of the observer, can be seen in Figures 1 and 2. The true horizon would appear higher in the window and increase the apparent curvature.

Figures 3 and 4 show a horizon quite close to the true horizon as the observer is at a lower altitude.

S C Wynn

2013-SCW-jab

S. C. Wynn

Attachments

REFERENCES

1. "Computer-Generated View of the Descartes Landing Area from the LM just after Hi-Gate," Bellcomm Memorandum for File B71 11021, R. A. Bass, G. S. Taylor, S. C. Wynn, November 18, 1971.

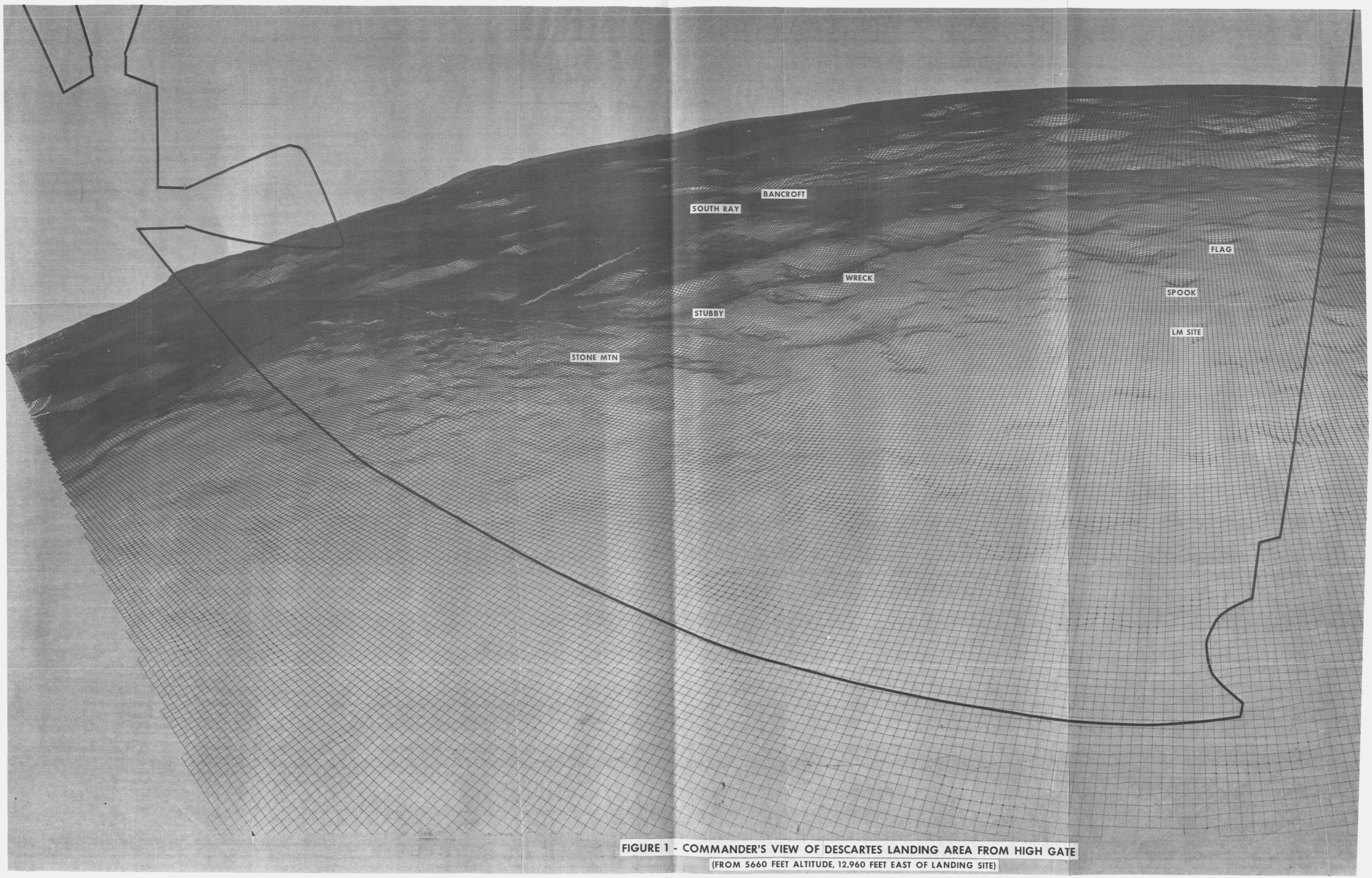


FIGURE 1 - COMMANDER'S VIEW OF DESCARTES LANDING AREA FROM HIGH GATE
(FROM 5660 FEET ALTITUDE, 12,960 FEET EAST OF LANDING SITE)

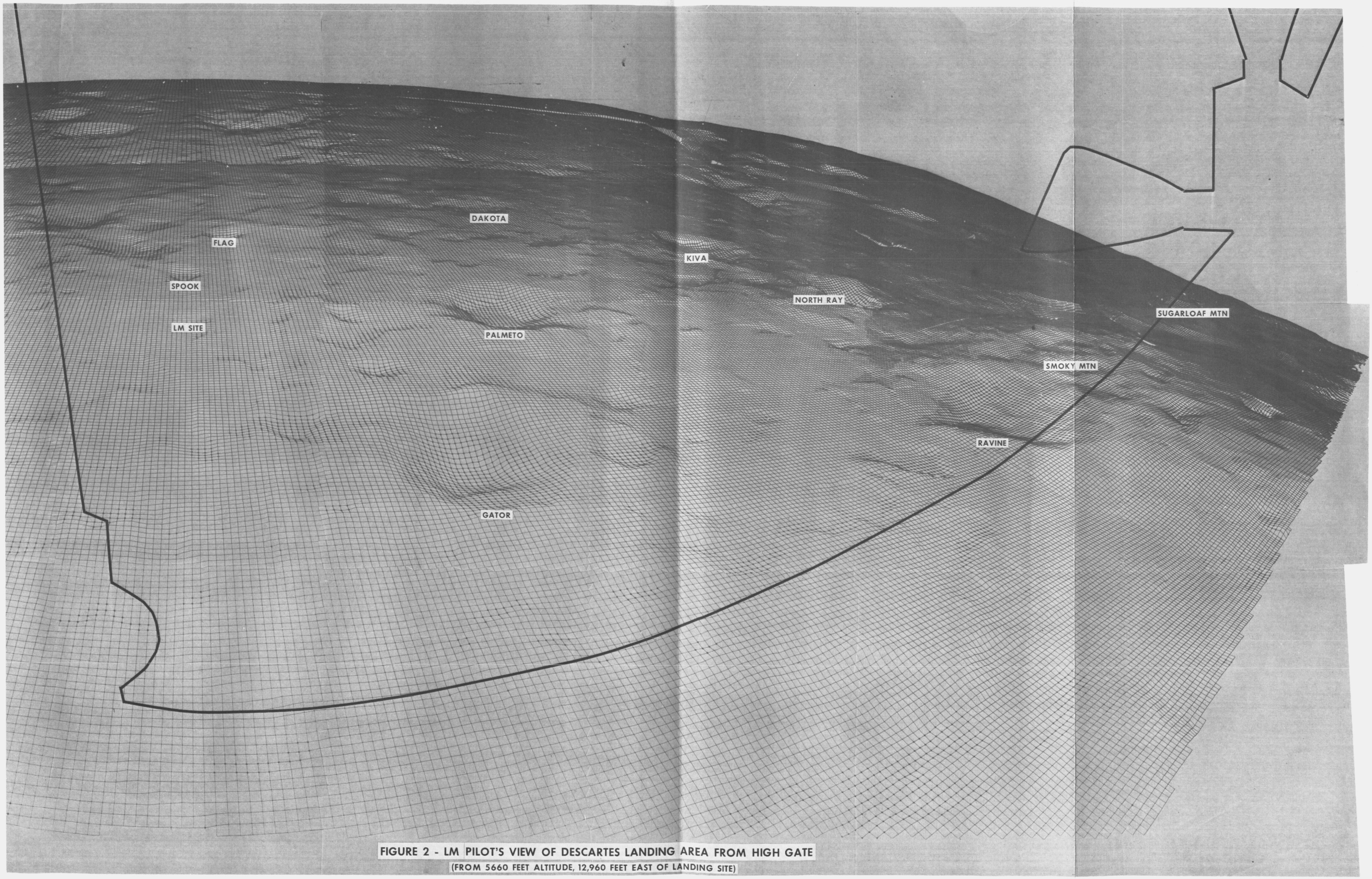


FIGURE 2 - LM PILOT'S VIEW OF DESCARTES LANDING AREA FROM HIGH GATE

(FROM 5660 FEET ALTITUDE, 12,960 FEET EAST OF LANDING SITE)

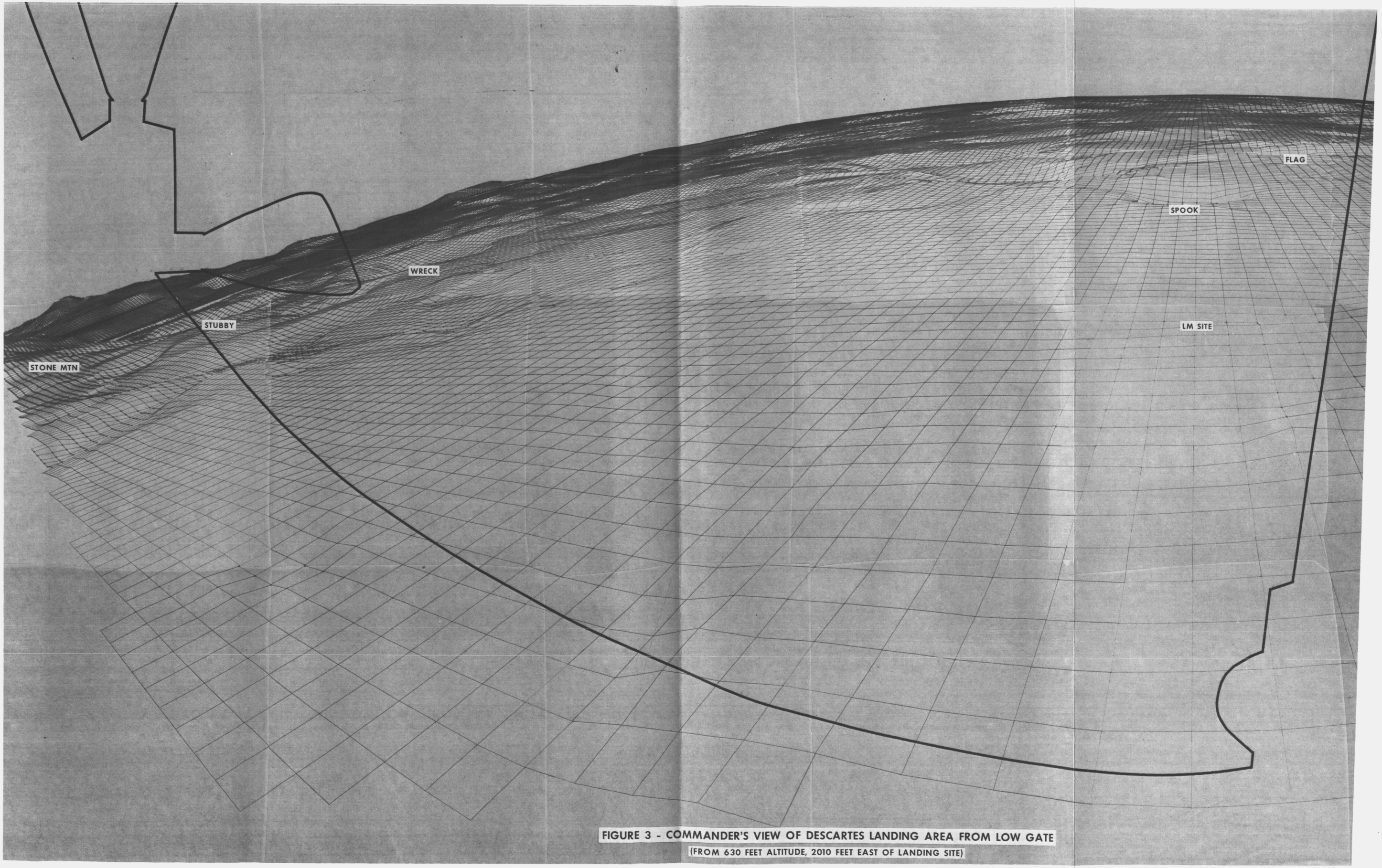


FIGURE 3 - COMMANDER'S VIEW OF DESCARTES LANDING AREA FROM LOW GATE

(FROM 630 FEET ALTITUDE, 2010 FEET EAST OF LANDING SITE)

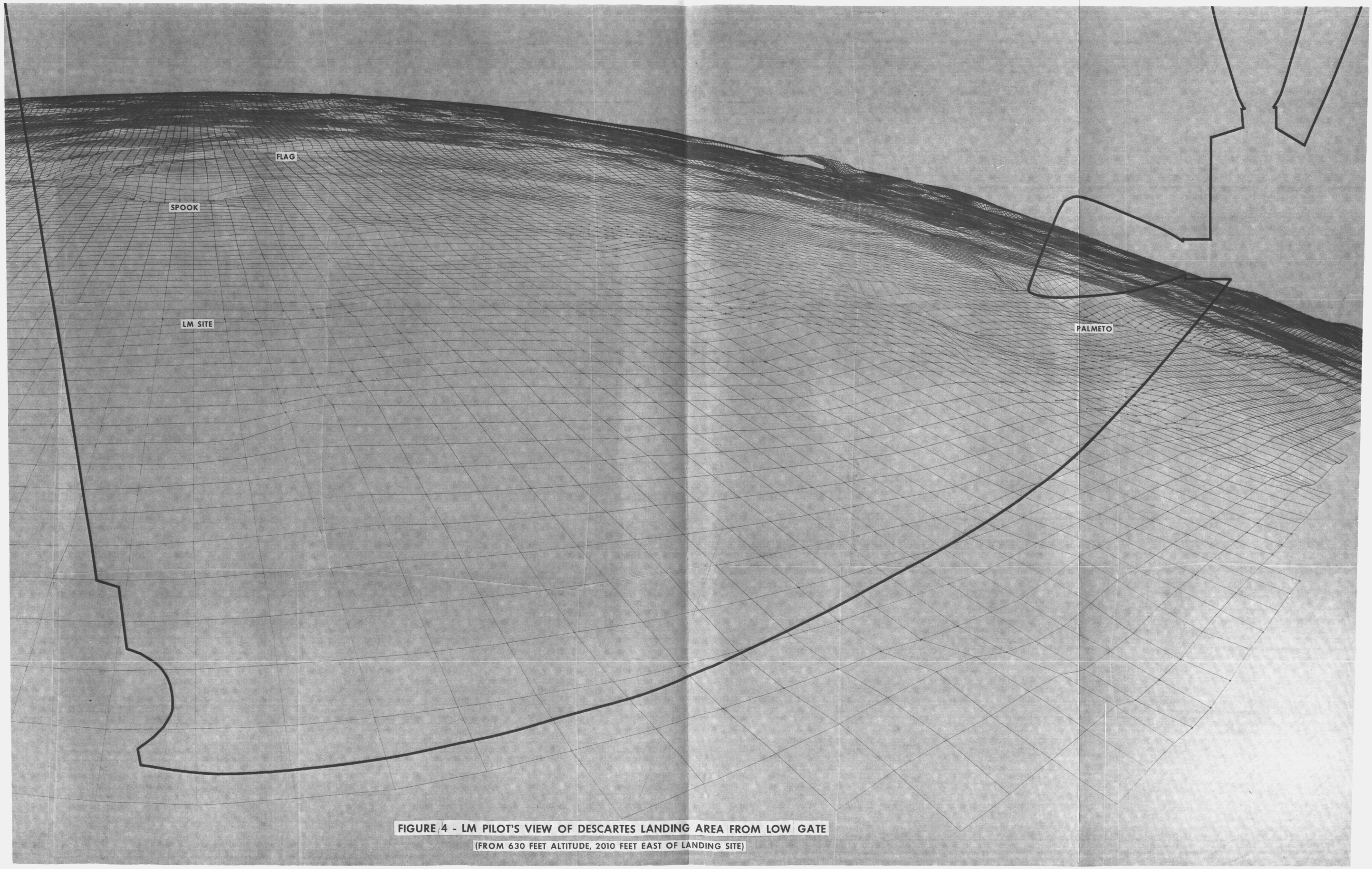


FIGURE 4 - LM PILOT'S VIEW OF DESCARTES LANDING AREA FROM LOW GATE

(FROM 630 FEET ALTITUDE, 2010 FEET EAST OF LANDING SITE)

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From: S. C. Wynn

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